Primary PCI update
Morriston Cardiac Centre

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Consultant Cardiologist

MINAP Roadshow / 1000 lives plus
20/6/2012
Village Hotel, Swansea
Optimal STEMI management
Stents or Lysis?

Like most cardiology students, Doreen breezes through chapter 9.
A brief history of Primary PCI.....

1983+
Case series
Safety & efficacy of PPCI proposed

1995 +
Early European adopters
Major European centres begin PPCI

2003
Meta analyses
Keeley et al PPCI superior to lysis

2005
MCC/UHW
Daytime PPCI for local popn

2009/10
Extended to 24/7 PPCI for local popn

2011
WHSCC
Commissions PPCI

2012
PPCI now available 24/7 to most of SWales

1990

1993+
RCT’s
PAMI / Zwolle
“Reduced mortality & re infarction and lower stroke rate with PTCA vs Lysis”

2000

2003
BCS/DOH
PPCI Pilot
London Chest, RD&E, Leeds etc..

2008
UK NIAP report
“PPCI is desirable, feasible & cost effective”

2010

2011
WHSCC
Commissions PPCI
Primary PCI; dominant reperfusion therapy
in England & Wales
Primary PCI rates in Europe

Widimsky P European Heart Journal 2010
Primary PCI rates in Europe

Primary PCI
UK Countries

PPCI pmp

5,188 deaths from CAD in Wales in 2008

British Cardiovascular Intervention Society (BCIS) National Audit

Widimsky P European Heart Journal 2010
Mid & West Wales
Primary PCI vs Lysis in ABMU/Hywel Dda 2010
Source: TK/DS MINAP/CCAD 2010
**STEMI in Wales – Population estimates**

<table>
<thead>
<tr>
<th>Region</th>
<th>Population</th>
<th>STEMI rate p.a*</th>
</tr>
</thead>
<tbody>
<tr>
<td>N Wales</td>
<td>700,000</td>
<td>280-350</td>
</tr>
<tr>
<td>Mid &amp; West Wales</td>
<td>933,000</td>
<td>373-466</td>
</tr>
<tr>
<td>South East Wales</td>
<td>1300,000</td>
<td>520-650</td>
</tr>
</tbody>
</table>

* Predicted hospitalised STEMI rate per annum based on 2010 BCIS audit data of 400-500 hospitalised STEMI’s per annum
All comer regional PPCI service
31/10/2011

• 24/7 PPCI service to ABMU, HD and Powys patients within 90 minute travel time of Morriston” (by air or land ambulance)

• PPCI workload now doubled  ~ 41 PPCI’s per month ( i.e ~ 500 PPCI’s p.a, ~ 500 PPCI p.m.p )

• High quality service

• Benefits realisation
  – Reduced L.O.S at referring hospitals
  – Reduced transfer times for routine ACS transfers
New unified South & Mid Wales STEMI pathway

If transfer to Morriston or UHW can be achieved within 90 mins by land or Air ambulance then t/f for PPCI. If > 90 mins then “Drip & Ship”
Morriston Cardiac Centre
Primary PCI activity

Number of Primary Angioplasties per month Jan 2011- May 2012

Start of 24/7 of All Comer Regional service

Morriston Cardiac Centre
Rescue PCI activity
What should the BCIS 2011-12 Audit show?

Using Mar 2012 projections for MCC/UHW:

- MCC
  480 PPCI’s in 2012
  103% of predicted PPCI pmp rate

- UHW
  456 PPCI’s in 2012
  70% of predicted PPCI pmp rate

- N Wales
  18 PPCI’s in 2012
  5% of predicted PPCI pmp rate

PPCI rates >600 pmp p.a – STENT FOR LIFE OBJECTIVE
Mid & West Wales
STE MI by home postcode (n=250)
## Call & Door to balloon times

<table>
<thead>
<tr>
<th>Metric</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median DTB (mins)</td>
<td>47</td>
</tr>
<tr>
<td>% of DTB &lt; 90 mins</td>
<td>81%</td>
</tr>
<tr>
<td>Median CTB (mins)</td>
<td>113</td>
</tr>
<tr>
<td>% of CTB &lt; 150 mins</td>
<td>76%</td>
</tr>
</tbody>
</table>

**Morriston Cardiac Centre**
DOOR TO BALLOON TIMES – Morriston Cardiac Centre

Direct and IHT: PCI Door to Balloon < 90 min

Better

89.7%

% DTB < 90 min

Number of Cases

2010 data: Ludman

MCC
CALL TO BALLOON TIMES – Morriston Cardiac Centre

Direct and IHT: Call to Balloon times < 150 min

Better

% CTB < 150 min

Number of Cases

77.3%

MCC
Case selection

MCC

% of PPCI cases >80 years old 11.30%

Primary PCI

% cases over 80 (2010 data)

Number of PPCI procedures
### Procedural technique – Morriston Cardiac Centre

<table>
<thead>
<tr>
<th>Drug/Medication</th>
<th>MCC</th>
<th>BCIS 2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aspirin 300mg</td>
<td>Yes</td>
<td></td>
</tr>
<tr>
<td>Prasugrel 60mg loading</td>
<td>5%</td>
<td></td>
</tr>
<tr>
<td>Clopidogrel 600mg loading</td>
<td>85%</td>
<td></td>
</tr>
<tr>
<td>Bivalirudin</td>
<td>22% (?)</td>
<td></td>
</tr>
<tr>
<td>Bail out GPIIbIIIa</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Radial access</td>
<td>83%</td>
<td>50%</td>
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</tbody>
</table>
STEMI admission route

MCC

Direct admission  81%
Inter hospital transfer  14%
Already in CCentre  5%
### Outcomes - Morriston Cardiac Centre

<table>
<thead>
<tr>
<th></th>
<th>Total no. of PPCI</th>
<th>Success TIMI3</th>
<th>Partial success TIMI2</th>
<th>Failure TIMI 0/1</th>
<th>Emerg CABG</th>
<th>CVA</th>
<th>In hospital Death</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MCC</strong></td>
<td>257</td>
<td>94.6%</td>
<td>2.5%</td>
<td>2.9%</td>
<td>0</td>
<td>0</td>
<td>3.10%</td>
</tr>
<tr>
<td><strong>BCIS 2010 audit</strong></td>
<td>17580</td>
<td>92.3%</td>
<td></td>
<td>0.08</td>
<td>0.32</td>
<td></td>
<td>4.4%</td>
</tr>
</tbody>
</table>

Source: Local BCIS databases for Morriston compared with national BCIS data for 2010
Length of Stay (days)

- **Mid & West Wales**
  - Local patients – Mean LOS 4.0 days
  - Repatriated patients – Mean LOS 3.4 days
  - **73% of patients staying 3 days or less**

(Source: n= 122 patients – between 31/10/2011 and 20/02/2012 – LW Informatics)
Mid & West Wales
Mean Length of stay (days)

Source: MCC data excludes repatriated patients.
LAD infarct

45 year old female, Chest pain, Anterior ST elevation on ECG

LAD post PCI – Complete ST resolution
Circumflex infarct

68 year old smoker, Chest pain, ECG normal

Circumflex post thrombectomy & PCI
Case study - PPCI time delays

- Chest pain onset: 18:00
- Call for help (999): 19:41
- Ambulance on scene: 19:48
- Diagnostic ECG: 19:59
<table>
<thead>
<tr>
<th>Description</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of previous visits</td>
<td>Previous Visits: 2</td>
</tr>
<tr>
<td>Date of arrival</td>
<td>16/06/2012</td>
</tr>
<tr>
<td>Time of arrival</td>
<td>20:34</td>
</tr>
<tr>
<td>Date of incident</td>
<td>16/06/2012</td>
</tr>
<tr>
<td>Time of incident</td>
<td></td>
</tr>
<tr>
<td>Place of incident</td>
<td>Home</td>
</tr>
<tr>
<td>Source of referral</td>
<td>Emergency Services</td>
</tr>
<tr>
<td>Mode of arrival</td>
<td>Ambulance</td>
</tr>
</tbody>
</table>
Ongoing ST elevation on A&E ECG
21:05
### Nursing Documentation - Emergency Department

**Admissions/Discharge**

- **Name:**
- **Diagnosis:** STEMI
- **Date:**
- **Time:** 22:18

### Notes Including Plan

<table>
<thead>
<tr>
<th>Date &amp; Time</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/6/12 21:15</td>
<td>Patient came to A&amp;E with gradual onset of central chest pain as burning in chest and does not radiate. Moderate pain. QTN + Aspirin given. ECG done. Observations done. News score 0.</td>
</tr>
<tr>
<td>23:00</td>
<td>Diuretics 5mg given. Catecholamines good effect.</td>
</tr>
</tbody>
</table>
Primary PCI to mid LAD  23:28
Post infarct ECG
Echo

• Severe LV systolic dysfunction
• EF 30%

Discharge plan

– Outpatient Echo in 6 weeks  ? ICD  ? CRT
– Community heart failure nurse follow up
Time delays

- Patient delay (Call for help) 101 mins
- Ambulance travel time 46 mins
- A&E delay 104 mins
- Cath lab mobilisation
- Door to Balloon (DTB) 184 mins (90 mins standard)
- Call to Balloon (CTB) 237 mins (150 mins)
Progression of myocardial necrosis with time since occlusion

30 min

Normal myocardium

“At risk” myocardium, ischemic but viable

Necrosis starting subendocardially

4 h

Normal myocardium

“At risk” myocardium, ischemic but viable

Necrosis extending towards subepicardium

6 - 12 h

Normal myocardium

Completed infarct involving whole area at risk

Adapted from Saltissi S, Mushahwar SS. Postgrad Med J. 1995;71:534-541, with permission.
Incident reporting
Ongoing work

• Accurate 12 lead ECG interpretation
• Fine tuning operational protocols – WAST/ Secondary/MCC
• Increasing Air ambulance utilisation for remote areas
• Repatriation pathways – Bed protection
• Audit and monitoring of data through MINAP / BCIS
• Improved discharge information including Cardiac Rehabilitation
• Communications to patients and public
Acknowledgements

• Dave Smith
• Cath lab team at Morriston Cardiac Centre
• WAST